

REMARKS

Claims 1-16 are pending in the application. Claims 1, 9 and 14 have been amended by the present amendment. The amendments are fully supported by the application as originally filed.

In the Office Action, the drawings were objected to, claims 1, 9, and 14 were rejected under 35 USC 112, first paragraph, as failing to comply with the written description requirement, and claims 1-16 were rejected under 35 USC 112, second paragraph, as being indefinite because of the limitation "a semiconductor package formed on the substrate is free of the tie bars." As amended, this limitation has been canceled from the claims, thereby obviating the drawing objection and claim rejections.

As amended, claim 1 recites that the substrate is linked to the supporting bars by means of no more than two external tie bars. Similarly, claim 9 recites an external two-point linkage structure, and claim 14 recites an external one-point linkage structure for linking the substrate and supporting bars. Support is provided in the application in FIGS. 2-5 (see dashed lines separating the individual substrates from the tie bars), and it is well known in the art that tie bars form part of a "substrate strip," not the substrate itself (see page 2, lines 12-15; FIGS. 1A-1C). As shown in FIG. 2A, e.g., tie bars 131, 132 are formed on edges of each substrate 110 (page 6, lines 1-8), i.e., the tie bars 131, 132 are external tie bars.

Applicants' claimed invention is directed to a substrate strip including a frame having a pair of supporting bars, and at least one substrate. The substrate strip includes no more than two tie bars for connecting the substrate to the supporting bars. In the case of using just two tie bars, the two tie bars can be arranged on two adjacent corners of the substrate (see FIG. 2A), or on diagonally opposite corners of the substrate (see FIG. 3A). Alternatively, one of the tie bars can be arranged on one corner of the substrate, and the other tie bar can be arranged on one side of the substrate (see FIG. 4A).

The above-described substrate strip can provide significant benefits. By using no more than two tie bars to connect the substrate to the supporting bars, at least two corners of the substrate are not connected to the tie bars. During high-temperature fabrication processes, when the substrate is subjected to thermal stresses, the substrate can freely expand toward the corners not connected to tie bars, and thus the thermal stresses can be released. Consequently, the thermal stresses would not concentrate toward the center of the substrate, thereby preventing the substrate from becoming warped (see, e.g., specification at page 6, lines 9-20).

Claims 1-16 were rejected under 35 USC 102(b) as being anticipated by U.S. Patent 5,652,185 to Lee. This rejection is respectfully traversed.

In the Office Action, it was indicated that the arrangement of the tie bars was not given patentable weight "because the final product does not require any tie bars at all." However, claims 1, 9, and 14 have been amended to cancel the limitation "a semiconductor package formed on the substrate is free of the tie bars." Claims 1, 9, and 14 clearly require the use of one or two tie bars, as explained above.

Lee does not teach or suggest a substrate strip having at least one substrate supported on the supporting bars by no more than two external tie bars, as recited in claim 1. Similarly, Lee does not teach or suggest an external two-point linkage structure consisting of just two tie bars (claim 9), or an external one-point linkage structure consisting of just one tie bar (claim 14).

With reference to FIGS. 3 and 4 of Lee, as cited in the Office Action, a substrate strip 124 is provided with a plurality of substrate units 130, where each of the substrate units 130 has its four corners connected to support sites 132, and slots 128, 129 are formed at sides of the substrate units 130. As indicated in column 4, lines 14-15, "each unit remains attached to the substrate at four support sites 132," and thus the support sites 132 correspond to tie bars.

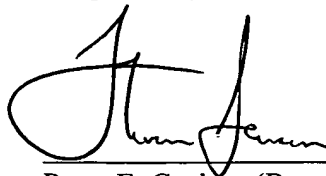
Because Lee requires the use of four support sites/tie bars 132 to connect each substrate unit 130, there is no teaching or suggestion of the limitations "no more than two external tie bars" (claim 1), the two-point linkage structure "consisting of just two tie bars" (claim 9), or the one-point linkage structure "consisting of just one tie bar" (claim 14). In Lee, there is no free corner of each substrate unit 130 to accommodate thermal expansion of the substrate units. Therefore, Lee does not teach or suggest the Applicants' claimed invention.

Moreover, the Lee reference was cited in an IDS filed with the application, and addressed in the Background section of the application (see page 3, lines 15-23). Specifically, it was explained in the specification that Lee discloses a four-point linkage structure similar to prior art FIGS. 1A-1D, and thus would be subject to the same problems. Since the four corners of each substrate unit 130 in Lee are provided with tie bars 132, the substrate units under thermal stresses cannot freely expand toward the corners, and the thermal stresses would concentrate toward the center of each substrate unit 130, making the substrate units 130 warped.

For at least the reasons explained above, Lee does not anticipate or otherwise render obvious the Applicants' claimed invention.

It is believed the application is in condition for immediate allowance, which action is earnestly solicited.

Respectfully submitted,



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